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**west virginia** department of environmental protection

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Earl Ray Tomblin, Governor  
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## **ENGINEERING EVALUATION / FACT SHEET**

### **BACKGROUND INFORMATION**

|                    |  |
|--------------------|--|
| Application No.:   | R13-0880D  |
| Plant ID No.:      | 099-00034  |
| Applicant:         | Quality Magnetite, LLC   |
| Facility Name:     | Kenova   |
| Location:          | Wayne County   |
| SIC Code:          | 1011   |
| Application Type:  | Modification   |
| Received Date:     | February 28, 2011  |
| Engineer Assigned: | Steven R. Pursley, PE  |
| Fee Amount:        | \$1,000.00   |
| Date Received:     | March 3, 2011  |
| Complete Date:     | March 30, 2011   |
| Due Date:          | June 29, 2011  |
| Applicant Ad Date: | March 2, 2011  |
| Newspaper:         | <i>Wayne County News</i>   |
| UTM's:             | Easting: 361.94 km      Northing: 4,244.52 km      Zone: 17  |
| Description:       | Increased hourly production, addition of a mill slag processing operation and classifier and added raw material storage. |

### **DESCRIPTION OF PROCESS**

Quality Magnetite is planning to add a process that will recover iron from mill slag. The additions contemplated in this process may also be used on occasion to process magnetite, which is the primary purpose of the facility. However, the equipment additions contemplated herein can only run one material at a time, either mill slag OR magnetite.

The contemplated changes encompass the addition of many transfer points associated with a previously permitted dryer and ball mill. There is also the addition of two double deck screens for a total of four screens as well as associated haulroad and stockpile emissions for the throughput for these processes.

## **Stockpile (5s)**

Raw material at an average of 10% moisture is shipped in by dump trucks and deposited in the stockpile shed. Raw material is stacked in place by front end loaders.

## **Plant Feed (7s)**

The raw material is picked up by front end loader and placed in a hopper “B” circuit with a feeding belt conveyor attached directly under that transfers material to a dryer feed belt. The dryer feed belt conveys material to the plant dryer.

## **Plant Process (6s)**

A Koppers kiln style rotating seal dryer with a 10 million BTU gas/oil burner is used to remove 99% of raw material surface moisture. Raw material is tumbled, dried and conveyed to a sealed 12" transfer chute then to a bucket elevator then to a double deck vibrating screen.

## **Plant Process (8as)**

Material at an average 1% moisture is sized, separated, and conveyed over a double deck vibrating screen that scalps off partials larger than 20 mesh from deck 1 to be transferred to a drum magnet. Material from deck 2 is transferred to a separate drum magnet and material passing through the screen is transferred to a third drum magnet. Deck 1 and 2 drum magnets transfers feed to a sealed residuals conveyor or when processing Magnetite to the sealed ball mill conveyor to an elevator to a 12" sealed screw conveyor to “A” circuit.

### **“B” Circuit**

Mill slag residuals conveyor transfers product to a residuals elevator and then are placed in Silo 15s or 16s. The mill slag ball mill screw will convey the material to a bucket elevator to the ball mill bin.

### **“A” Circuit**

The finished product screw conveyor circuit transfers finished product to a bagging station to be packaged for the shipment or finished product elevator 1 or 2. Finished product elevator 1 or 2 conveys the material to two-way valves. At this valve material can be placed in storage silos 1, 2, 3, or to a gravity bypass load out chute directly onto a bulk pneumatic trailer for transport or to B storage transfer screws then to B storage main transfer screw to silo feed screw then to silo 4-5-6.

Finished product stored in Silos is gravity loaded through a chute onto bulk pneumatic trailers for transport.

### **Plant Process (10S)**

Material from the Ball Mill Elevator is transferred to the ball mill storage bin to feed the ball mill. The ball mill uses steel balls to crush particles to a finer size. The ball mill discharge is transferred into an air conveyor feed tube and then enters an air to air classifier. Fine product discharges through a rotary air lock/feeder under the bottom of the cyclone to the sealed residual conveyor and coarse product is transferred to a diverter valve. Mill slag is transferred to a double deck screen, that scalps off partials larger than 20 mesh from deck 1 to be transferred to a drum magnet. Deck 2 (minus 20 x 60 mesh) partials are transferred to another drum magnet and the remaining partials are transferred to a third drum magnet. Deck 1 and 2 drum magnets transfer feed to a sealed residual conveyor, or when processing magnetite, to the sealed ball mill conveyor to an elevator to a 12" sealed screw conveyor to "A" circuit. When processing magnetite to a finished product screw conveyor to "A" circuit, oversized is discharged to a drum magnet where iron is transferred by a sealed conveyor back to the ball mill feed to be milled to proper size and residuals are transferred by a sealed conveyor to residuals conveyor.

### **Plant Process (14s)**

Material is sized, separated, and conveyed over a 14s double deck vibrating screen to drum magnets. Deck #1 transfers +20 mesh material to a drum magnet where high iron material is transferred by a sealed conveyor to 19s stock pile. Low iron material is transferred to a sealed conveyor and returned to the ball mill conveyor. Deck #2 transfers 20 x 60 mesh material to a triple drum magnet. #5a drum magnet transfers high iron material by a sealed conveyor to 18s stock pile by a conveyor. Low iron material is transferred to #5b drum magnet. #5b drum magnet transfers mid iron material by a sealed conveyor to the silo elevator then to 17s silo. Low iron material is transferred to #5c drum magnet. #5c drum magnet transfers low iron material to a sealed conveyor which returns it to the ball mill conveyor. Residual material is transferred to the residual conveyor. Deck #3 transfers -60 mesh material to #6 drum magnet where mid iron material is transferred to a sealed conveyor to a silo elevator and then to 17s silo. Residual material is transferred to the residual conveyor.

### **SITE INSPECTION**

Fred Teel of DAQs enforcement section completed a full on-site inspection on September 7, 2010 and found the facility to be in compliance. Therefore, no inspection of the facility was performed by the writer.

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Controlled particulate emissions from the modified facility will be as follows:

|                     | PM           |              | PM <sub>10</sub> <sup>1</sup> |              |
|---------------------|--------------|--------------|-------------------------------|--------------|
|                     | lb/hr        | tpy          | lb/hr                         | tpy          |
| Transfer Pts.       | 3.70         | 7.14         | 1.56                          | 3.03         |
| Screens             | 3.02         | 6.03         | 0.18                          | 0.36         |
| Ball Mill           | 0.18         | 0.38         | 0.02                          | 0.04         |
| Dryers              | 18.62        | 36.45        | 11.34                         | 22.20        |
| Nat. Gas Combustion | 0.35         | 0.38         | 0.17                          | 0.18         |
| Oil Combustion      | 0.19         | 0.62         | 0.09                          | 0.29         |
| Stockpiles          | 0.81         | 3.52         | 0.38                          | 1.65         |
| Silos (15S,16S&17S) | 0.02         | 0.08         | 0.01                          | 0.03         |
| Haul Roads          | 17.15        | 31.94        | 5.07                          | 9.43         |
| <b>Total</b>        | <b>44.04</b> | <b>86.54</b> | <b>18.82</b>                  | <b>37.21</b> |

<sup>1</sup>All PM<sub>10</sub> is assumed to be PM<sub>2.5</sub>

Controlled non particulate emissions from the modified facility will be as follows:

|                     | NO <sub>x</sub> |             | VOC         |             | CO          |             | SO <sub>2</sub> |             |
|---------------------|-----------------|-------------|-------------|-------------|-------------|-------------|-----------------|-------------|
|                     | lb/hr           | tpy         | lb/hr       | tpy         | lb/hr       | tpy         | lb/hr           | tpy         |
| Nat. Gas Combustion | 4.57            | 5.00        | 0.36        | 0.39        | 3.84        | 4.2         | 0.03            | 0.03        |
| Oil Combustion      | 1.05            | 3.45        | 0.03        | 0.08        | 0.10        | 0.32        | 1.32            | 4.35        |
| <b>Total</b>        | <b>5.62</b>     | <b>8.45</b> | <b>0.39</b> | <b>0.47</b> | <b>3.94</b> | <b>4.52</b> | <b>1.35</b>     | <b>4.38</b> |

Note that hourly emissions are based on firing natural gas 25% of the time and oil 75% of the time (i.e annual emissions/8760\*.75 for oil). Also note that the hourly emissions for natural gas combustion seem high. In the writers opinion this is probably a result of the applicant underestimating the number of hours per year that natural gas is combusted.

## REGULATORY APPLICABILITY

The following state and federal regulations apply to the facility:

### STATE RULES:

*45CSR7 - To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations*

The facility is subject to the requirements of 45CSR7 because it meets the definition of "Manufacturing Process" found in subsection 45CSR7.2.20. The facility should be in compliance with Subsection 3.1 (no greater than 20% opacity), Subsection 3.7 (no visible emissions from any storage structure pursuant to subsection 5.1 which is required to have a full enclosure and be equipped with a control device), Subsection 4.1 (PM emissions shall not exceed those allowed under Table 45-7A), Subsection 5.1 (manufacturing process and storage structures must be equipped with a system to minimize emissions), Subsection 5.2 (minimize PM emissions from haulroads and plant premises) when the particulate matter control methods and devices proposed within application R13-0880D are in operation.

According to Table 45-7A, for a type 'b' source with a maximum process weight rate of 84,475 lb/hour (conservatively estimated as the yearly throughput divided by 8760 hours per year), the maximum allowable emission rate is 32.4 lb/hour of particulate matter. The permit will limit emissions from all point sources at the facility to a total of 26.1 pounds per hour. Therefore, the requirements of 45CSR7 should be met.

*45CSR10 - To Prevent And Control Air Pollution From The Emission Of Sulfur Oxides*

The facility is subject to the requirements of 45CSR10 because it meets the definition of "Manufacturing Process" found in subsection 45CSR10.2.11.

### §45-10-2.11

"Manufacturing Process" means any action, operation or treatment embracing chemical, industrial or manufacturing efforts, and employing, for example, heat-treating furnaces, by-product coke plants, core-baking ovens, mixing kettles, cupolas, blast furnaces, open hearth furnaces, heating and reheating furnaces, puddling furnaces, sintering plants, electric steel furnaces, ferrous and non-ferrous foundries, kilns, stills, pipe stills, reformers, furnaces associated with manufacturing processes, driers, crushers, grinders, roasters, and equipment used in connection therewith, and all other methods or forms of manufacturing or processing that may emit sulfur dioxide or other sulfur compounds.

*45CSR13 - Permits For Construction, Modification, Relocation and Operation Of Stationary Sources Of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures For Evaluation*

The purpose of this rule is to set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source and to relocate non-major stationary sources within the state of West Virginia.

The proposed modification is subject to the requirements of 45CSR13 because it will result in an increase in potential controlled emissions greater than six (6) pounds per hour and ten (10) tons per year, and 144 pounds per day of a regulated air pollutant (PM), the proposed changes require a modification permit. The applicant submitted the proper \$1000 application fee and published a Class I legal advertisement in the *Wayne County News* on March 02, 2011.

*45CSR22 - Air Quality Management Fee Program*

This rule establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution. Funds collected from these fees will be used to supplement the Director's budget for the purpose of maintaining an effective air quality management program.

NON-APPLICABILITY DETERMINATIONS

*40 CFR 60 Subpart LL: Standards of Performance for Metallic Mineral Processing Plants*

The proposed modification is not subject to 40 CFR 60 Subpart LL because this facility does not produce a metallic mineral concentrate and does not meet the NSPS subpart LL definition of a metallic mineral processing plant.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The only non-criteria regulated pollutants that will be emitted from the facility are the very small amounts that are a normal by product of oil and natural gas combustion.

## AIR QUALITY IMPACT ANALYSIS

Since this is a minor source as defined in 45CSR14, no modeling was performed.

## MONITORING OF OPERATIONS

In addition to the monitoring and record keeping already required by the permit, the following parameters shall also be monitored.

- \* The amount of mill slag processed on a monthly basis.
- \* The amount of fuel (natural gas and oil) used to fire the dryers.

## CHANGES TO PERMIT R13-0880C

Three major changes will be made to the permit.

- \* Emission limits will be added to section 4.1
- \* The amount of mill slag processed will be limited and appropriately monitored.
- \* The fuel usage by the kiln will be limited and appropriately monitored.

Additionally, all current limits in the permit will be updated.

## NOTES ON THE HISTORY OF PERMIT APPLICATION R13-0880d

R13-0880D originally went to notice on July 6, 2011 (ad date). After receiving the draft permit the applicant commented that the throughput limit in the permit should apply only to the "B circuit". After discussion, it became apparent that the applicant believed that his existing permit (R13-0880C) permitted a maximum of 150,000 tons per year of throughput EACH for "A circuit" and "B circuit". In fact, R13-0880C limits the permittee to 150,000 tons per year from the two circuits combined.

## **HISTORY**

Permit R13-0880B increased the limit of "A Circuit" from 80,000 tpy to 150,000 tpy. Permit application R13-0880C was intended to request the addition of a second "B circuit" of an additional 150,000 tpy (along with some related changes). However, when the permit was issued it limited the **combined** circuits to 150,000 tpy.

Permit application R13-0880D requested an increase in the throughput limit from 150,000 tpy to 220,000 tpy. When more specific requirements were put into draft permit R13-0880D than existed in permit R13-0880C it led to the disconnect being discovered.

So at the permittee's request, the writer went back and revised the engineering evaluation and draft permit to reflect a throughput limit of 150,000 tpy for Circuit A and 220,000 tpy for Circuit B. Since permit applications R13-0880C and D addressed only Circuit B, applications R13-0880B (for A circuit) and R13-0880D (for B circuit) were simply combined into this permit. This resulted in an increase in permitted emissions and therefore required a new public notice.

#### RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-0880D for the modification of a magnetite processing facility near Kenova, Wayne County, be granted to Quality Magnetite, LLC

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Steven R. Pursley, PE  
Engineer

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August 11, 2011

Fact Sheet R13-0880D  
Quality Magnetite, LLC  
Kenova Facility